

**PATENT COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**  
(Chapter II of the Patent Cooperation Treaty)  
(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference 449720/DH/gjm	<b>FOR FURTHER ACTION</b>	See Form PCT/IPEA/416
International application No. CT/AU2004/000637	International filing date (day/month/year) 14 May 2004	Priority date (day/month/year) 14 May 2003
International Patent Classification (IPC) or national classification and IPC Int. Cl. <sup>7</sup> G08B 17/10		
Applicant VISION FIRE & SECURITY PTY LTD et al		

- This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
- This REPORT consists of a total of 4 sheets, including this cover sheet.
- This report is also accompanied by ANNEXES, comprising:
- a. ☒ (sent to the applicant and to the International Bureau) a total of 3 sheets, as follows:
- ☒ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
- ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
- b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or table related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).
4. This report contains indications relating to the following items:
- |                                     |              |   |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the report   |
| <input type="checkbox"/>            | Box No. II   | Priority  |
| <input type="checkbox"/>            | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  |
| <input type="checkbox"/>            | Box No. IV   | Lack of unity of invention  |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited   |
| <input type="checkbox"/>            | Box No. VII  | Certain defects in the international application  |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application   |

Date of submission of the demand 11 March 2005	Date of completion of the report 5 September 2005
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer  <b>JUZER KHANBHAI</b> Telephone No. (02) 6283 2176

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2004/000637

## Box No. I Basis of the report

With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

- ☐ This report is based on translations from the original language into the following language which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1 (b))  
☐ publication of the international application (under Rule 12.4)  
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

- ☐ the international application as originally filed/furnished

- ☒ the description:

pages 1-22 as originally filed/furnished  
pages\* received by this Authority on with the letter of  
pages\* received by this Authority on with the letter of

- ☒ the claims:

pages 23-25 as originally filed/furnished  
pages\* as amended (together with any statement) under Article 19  
pages\* 26-28 received by this Authority on 11 March 2005 with the letter of 11 March 2005  
pages\* received by this Authority on with the letter of

- ☒ the drawings:

pages 1/15-15/15 as originally filed/furnished  
pages\* received by this Authority on with the letter of  
pages\* received by this Authority on with the letter of

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages  
☐ the claims, Nos.  
☐ the drawings, sheets/figs  
☐ the sequence listing (*specify*):  
☐ any table(s) related to the sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages  
☐ the claims, Nos.  
☐ the drawings, sheets/figs  
☐ the sequence listing (*specify*):  
☐ any table(s) related to the sequence listing (*specify*):

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2004/000637

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

## Statement

Novelty (N)	Claims 8-14, 32-40, 45, 47, 49	YES
	Claims 1-7, 15-31, 41-44, 46, 48, 50-53	NO
Inventive step (IS)	Claims 8-14, 32-35, 37-40, 45, 47, 49	YES
	Claims 1-7, 15-31, 36, 41-44, 46, 48, 50-53	NO
Industrial applicability (IA)	Claims 1-53	YES
	Claims -	NO

## Citations and explanations (Rule 70.7)

NOVELTY (N) claims 1-7, 15-31, 41-44, 46, 48, 50-53

D1-US 5696379 A (STOCK) 9 December 1997

D2-US 5576697 A (NAGASHIMA et al.) 19 November 1996

D3-US 3924252 A (DUSTON) 2 December 1975

The present invention is directed toward the field of smoke detection and uses radiation scattered from an incident beam in a monitored area to detect particles.

D1 is a measuring device for detecting gas using modulated multiple beam infra red absorption. It is considered that claims 1-7, 15-26, 28-31, 41-44, 46, 48, 50-53 are not novel in light of D1. D1 does not disclose a laser device.

D2 is a fire alarm which detects fire by measuring the properties of scattered radiation emitted from multiple light emitting devices. It is considered that claims 1-7, 15-31, 41-44, 46, 48, 50-53 are not novel in light of D2 which discloses all features of the claims.

D3 discloses a method of laser smoke detection and it is considered that claims 1-7, 15-31, 41-44, 46, 48, 50-53 are not novel in light of D3 which discloses all features of the claims.

INVENTIVE STEP (IS) claims 1-7, 15-31, 36, 41-44, 46, 48, 50-53

Claims 1-7, 15-31, 41-44, 46, 48, 50-53 as above.

Claim 36: The feature of using a computer to implement a method as in claim 36 is considered to lack an inventive step in light of any of D1-D3 when combined individually with common general knowledge. Computer monitoring of building environment (eg. Climate control & burglar alarms) is very well known in the field of building maintenance.

None of D1-D3 disclose or suggest the detection of smoke in sub-regions to localise its source and as such the remaining claims are considered to be novel and inventive over the cited art.

**x No. VIII Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claims 4-8, 10-14, 16-27, 30-31 and 33-35 are not clear because they are either appended to themselves or to an earlier claim which is appended to itself. For example claim 4 describes "[a] method as claimed in claim 4". This problem persists throughout the claims.

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and second point; calculating a region of interest containing the determined beam path.

30. A method as claimed in claim 30, wherein the step of locating a second point is performed with at least one substantially transparent probe.

31. A method as claimed in claim 31, wherein the probe is removed from the beam path.

5 32. A method of determining the level of smoke at one or more subregions in a region of interest comprising: directing a beam of radiation within the region, selecting a view of at least a portion of a path of the beam with an image capture device, determining the location of the source of the radiation relative to the image capture device, determining the direction of the beam relative to the image capture device, dividing the beam of  
10 radiation into segments, determining a geometric relationship between the segments and the image capture device, adjusting a level of light received by the image capture device of each segment so as to allow for the geometric relationship.

33. A method as claimed in claim 33, wherein the segments comprise at least one pixel.

15 34. A method as claimed in claim 34, wherein the segments are grouped to form the subregions for smoke detection.

35. Apparatus adapted to detect particles, said apparatus comprising processor means adapted to operate in accordance with a predetermined instruction set, said apparatus, in conjunction with said instruction set, being adapted to perform the method as claimed in any one of claims 1 to 15 and 29 to 35.

20 36. A computer program product comprising; a computer usable medium having computer readable program code and computer readable system code embodied on said medium for detecting particles within a data processing system, said computer program product comprising; computer readable code within said computer usable medium for performing the method steps of any one of claims 1 to 15 and 29 to 35.

25 37. A method of detecting particles including emitting a beam of radiation into a monitored region and detecting a variation in images of the region indicating the presence of the particles comprising assigning different threshold values for different spatial positions

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within the region.

38. A method as claimed in claim 37 including modulating the beam of radiation.

39. A method as claimed in claim 38, wherein scattered radiation within the zone is represented in one or more segments of a corresponding image, which allows for the location of the particles in the region to be identified.

40. A method as claimed in claim 39, wherein the location of the particles is determined in accordance with a geometric relationship between the locations of a source of emitted radiation, a direction of the emitted radiation and a point of image detection wherein, the geometric relationship is determined from the images.

41. A method as claimed in any one of the preceding claims, wherein the detected variation is an increase in scattered radiation intensity.

42. The method as claimed in claim 5, wherein the increase is assessed with reference to a threshold value.

43. The method as claimed in claim 6, wherein the threshold value is calculated by averaging integrated intensity values from the images.

44. A method as claimed in any one of the preceding claims, comprising directing the radiation along a path and identifying a target in the images, the target representing a position at which the radiation is incident on an objective surface within the region.

45. A method as claimed in claim 9, wherein a location of the target in the images is monitored and the emission of radiation is ceased in response to a change in the location of the target.

46. A method as claimed in any one of the preceding claims, comprising identifying a location of an emitter in the images.

47. A method as claimed in claim 11, comprising determining an operating condition of the emitter based on radiation intensity at the identified location of the emitter.

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48. A method as claimed in any one of the preceding claims, wherein the images are processed as frames which are divided into sections which represent spatial positions within the monitored region.
49. A method as claimed in claim 13, comprising monitoring intensity levels in associated  
5 sections of the images and assigning different threshold values for different spatial positions within the region which correspond to the associated sections.
50. Apparatus for monitoring a region, comprising:  
an emitter for directing a beam of radiation comprising at least one predetermined characteristic into the region;  
10 an image capture device for obtaining at least one image of the region; and  
a processor for analysing the at least one image to detect variation of the at least one characteristic between the images, indicating presence of particles within the region.
51. Apparatus as claimed in claim 16 where the processor is adapted to determine the  
15 location of particles in accordance with a geometric relationship between the locations of the emitter, the directed beam of radiation and the image capture device wherein, the geometric relationship is determined from the analysed images.
52. Apparatus as claimed in claim 16 or 17, comprising a plurality of emitters, arranged to direct radiation along different respective beam paths.
- 20 53. The apparatus as claimed in claim 18, further comprising one or more filters for adapting the image capture device to capture radiation from the emitter in preference to radiation from other sources.